# Headwaters and Homesteads

*For use with: Arizona Wildlife Views Television Show, 08-09 Season, Episode 1*

Human-Environment Interactions; Habitat Restoration; Experimental Design

**Time Frame:** 3-4 hours **Grade:** 4-8

**Overview:**

This video explores some of the work to protect important wildlife habitat in Arizona. First, it takes a look at property at the headwaters of the Verde River owned by the Arizona Game and Fish Department and how this will be used as a native fish nursery. Then, it focuses on the efforts of a rancher in southeastern Arizona to conserve his land in perpetuity. The other segment features a person who "talks to the birds." Students will have the opportunity to sample and compare nearby habitats and explain the differences.

**Essential Questions**

- How can human activities benefit and harm wildlife?
- What techniques do scientists use to study the natural world?

**Objectives**

- Describe ways that ranchers can help wildlife.
- Use plots to compare plant populations in two distinct areas.
- Explain the importance of random sampling and sample size.

**Arizona Department of Education Standards**

*Science*

| 4th grade | 5th grade | 6th grade | 7th grade | 8th grade |
|---|---|---|---|---|
| S1-C2-PO3 | S1-C2-PO4 | S1-C2-PO3 | S1-C2-PO3 | S1-C2-PO4 |
| S1-C2-PO4 | S1-C3-PO1 | S1-C2-PO4 | S1-C2-PO4 | S1-C3-PO1 |
| S1-C3-PO1 | S1-C3-PO4 | S1-C3-PO1 | S1-C3-PO1 | S1-C3-PO4 |
| S1-C3-PO2 | S1-C3-PO5 | S1-C3-PO6 | S1-C3-PO5 | S1-C3-PO5 |
| S1-C3-PO5 | | | S1-C3-PO7 | S1-C3-PO8 |
| S2-C1-PO2 | | | S3-C1-PO1 | S2-C1-PO4 |
| S3-C1-PO1 | | | | S2-C2-PO4 |
| S4-C3-PO4 | | | | |

*Workplace Skills*

| 4th – 8th grades | |
|---|---|
| 5WP-E3-PO1 | |

**Materials and Resources**

- Copy of Arizona Wildlife Views episode
- Wooden stakes (4-8 per group)
- Tape measure (1-2 per group)
- String or rope
- Bean bags

**Teacher Preparation**

- Acquire a copy of the television show. You can check local listings to determine when it will air and record it directly. You may also check the Department's web site to see if a copy can be downloaded or ordered.
- Write the vocabulary words and questions on the board.

**Background Information:**

This is not a lesson plan in the traditional sense. It does not provide step-by-step directions for completing an activity. Instead, it provides information to help you use an episode of the *Arizona Wildlife Views* television program in

your classroom. It contains five suggested activities along with extensions and modifications. The first activity focuses on vocabulary. We have provided and defined some of the words used in the video. You are encouraged to use any appropriate strategies to introduce these to your students. Then, there is a series of comprehension questions that students can answer while watching the video. Answers (directly from the video) are provided in italics. Next, the critical thinking questions build on the major concepts introduced in the video. Students need to put a little bit more thought into these questions. Some reasonable answers are provided in italics. However, teachers should be cautious and realize that students may provide additional answers that can be supported with evidence. Then, there is an in-depth activity. This activity allows students to evaluate and synthesize one or more of the concepts from the video, perhaps applying it to a new context or utilizing additional skills. The last activity allows students to explore wildlife-related careers in a little more detail.

This episode originally aired on PBS (KAET Channel 8) in Phoenix on January 18, 2009. It may also be shown on regional PBS stations or other channels. For additional viewing information or download options, please visit **http://www.azgfd.gov/focuswild**.

Additional information about the programs featured in this episode can be found at:

- ✓ Upper Verde River Wildlife Area: http://www.azgfd.gov/outdoor_recreation/wildlife_area_upper.shtml
- ✓ Important Bird Areas Program: http://www.audubon.org/bird/iba/index.html
- ✓ Landowner Relations Program: http://www.azgfd.gov/outdoor_recreation/landowner_relation.shtml
- ✓ Arizona Open Land Trust: http://www.aolt.org/

**Relevant Vocabulary:**

- o Aquifer – an underground layer of rock, gravel, and sand that contains water
- o Conservation Easement – an agreement between a land owner and another organization (usually a government agency) which protects the land from development but allows the landowner to still own the property
- o Headwaters – the origin or source of a river or stream
- o Homestead – land acquired under the Homestead Act of 1862 which allowed settlers to receive, for free, up to 160 acres of land if they could live on the land and improve it (i.e., build a home, produce crops) for a set amount of time, typically five years.
- o Riparian – the area immediately surrounding rivers or streams
- o Understory – the layer of plants growing under the highest layer of trees (i.e., grasses, shrubs, small trees)
- o Water Table – the point at which underground water (i.e., aquifer) is first encountered

**Comprehension Questions:**

1. For what animals will Stillman Lake serve as a nursery? *Answer: Native fish, including roundtail chub and razorback sucker.*
2. What is Arizona's only federally designated wild and scenic river? *Answer: The Verde River.*
3. What has been the greatest threat to this river? *Answer: Groundwater pumping.*
4. Where is the 47 Ranch located? *Answer: It is in southeastern Arizona in Cochise County. It is located next to the Mule Mountains between Tombstone and Douglas.*
5. How many total acres are grazed by the owners of 47 Ranch? *Answer: About 34,000.*

6. How many of these acres are currently protected by the conservation easement? *Answer: Nearly 1,000 acres.*
7. What happens to a conservation easement if the property is sold? *Answer: It remains a part of the deed and passes to the new owner.*
8. How many bird calls can Nicole Perretta make? How many different species of birds does this represent? *Answer: About 146 calls representing 121 different species.*

**Critical Thinking Questions:**

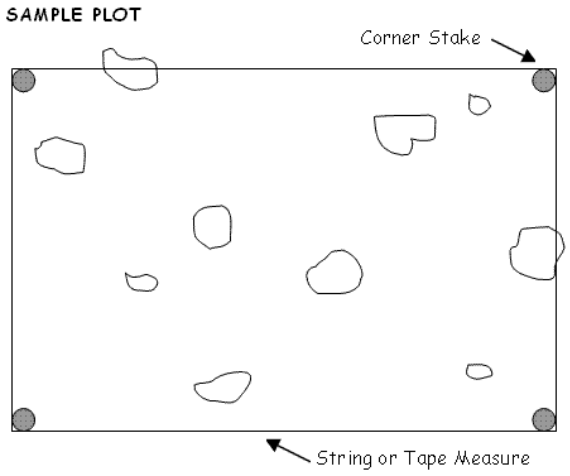
1. Dennis Moroney used the term "biological crossroads" to describe the habitat protected by the conservation easement. What did he mean? *Answer: Biological crossroads is a descriptive term to describe an area that sits at the boundary of two or more habitat types. It is in these areas that you see significant biodiversity as plants and animals unique to the different regions come together.*
2. In terms of cattle ranching, what is meant by the term "rest and rotation"? *Answer: It is a method of ranching which ensures that vegetation has adequate time to recover from any grazing activities. At any one time, an entire ranch is not being actively grazed. Parts of the land are being "rested" and closed to cattle so that the vegetation can grow back. Later, this area will be opened while another is closed and rested.*

**In-Depth Activity: Vegetation Sampling**

Dennis Moroney mentioned that the north and south slopes of the canyons on his property contained different plants. Is this unique to his land or can this be found elsewhere. You are going to try to find out.

Near your school or you house, try to identify a small hill that you can use for your study. If you cannot find a hill, find two natural spaces that you can compare. This might be near a road and away from a road or near water and away from water.

Rather than counting all of the plants that occur in your site, we are going to do a sample. A sample is a small part that can represent the whole. First, you should choose one plant to study. Does your site have a plant that appears to dominate? Perhaps it is the largest or most common species. This will be the species you will use for the study. However, even focusing on one plant can be tedious. Often there are too many of that one species to get a reliable number. So, you are going to do a plot. A plot is a square or rectangular sample of your entire site. It is usually marked off by stakes and string or rope. The idea is that you would count all of the plants within the plot. The illustration below shows a sample plot.




You will be setting up two plots, one on the north side of your hill and one on the south side. If you are not using a hill, you will place the plot in each of the two comparative areas. To select the location for your plot within your

site, it is important to be random. Have one person in your group hold the bean bag and close their eyes. Carefully spin this person around so they do not know which direction they are facing. With his or her eyes still closed, this person can throw the bean bag. Wherever the bean bag lands will be the location of the upper left corner of your plot.

From there, measure out a 5 or 10 meter square plot, depending on the space and the direction of your teacher. Repeat these same procedures for the second plot.

Now all you have to do is count all of your chosen plants within your two plots. As a group, you will have to decide what you will do with plants that occur on the border of your plot. Will you count them? Whatever you choose, you just need to make sure you are consistent with both plots.

It is always best to have more plots. If you have the opportunity, set up additional plots in both locations.

Now that you have counted the plants, it is time to compare. If you had more than one plot at each site, average the number of plants found. Compare the number of plants found between the two sites. Are they the same? If not, why do you think there are differences? Could you design an experiment to try to determine if you are correct?

Beyond the one plant species that you looked at, what other similarities and differences did you notice between the sites? Could you develop an experiment to determine if those differences are real or just perceived?

What is the advantage of having more than one plot at a location? Why is this important? Why is it important to have the plots in random locations?

**Career Focus**

This video provided a brief look at one or more careers related to wildlife management and conservation. These careers are listed below along with the segment of the video in which they appeared.

Watch the segments related to the specific career. Write down notes about how this career helps wildlife. Use the Internet to research additional information about this career, including specific job duties, education and training required, potential salaries, and future outlook.

Careers featured in this episode:

- Ranching (Segment 2)

**Differentiated Instruction:**

*Extensions:*

- **Mathematics:** The 47 Ranch is approximately 25,000 acres. If there are 640 acres in 1 square mile, how many square miles does the ranch cover? Tombstone (4.3 square miles) is a small city close to the ranch. How many Tombstones would fit in the area covered by the ranch? What percentage of the ranch is protected by the conservation easement?
- **Geography:** Pretend you want to do some birdwatching at the Upper Verde River Wildlife Area. It is located near Chino Valley. Locate this city on a map. In addition, locate your school or home. What is the straight line distance (in miles) between these two locations? Using a road map, plan the shortest route from your school or home to Chino Valley. How many miles would you need to travel?
- **Social Studies:** Research the Homestead Act of 1862. Why was it created? What were the specific requirements to receive the land? How much land was homesteaded? When was the last homestead granted in the United States? What other countries have or had similar laws?
- **Life Skills:** Identify a rancher in your local community. Contact them through telephone or email to discuss their career. If possible, invite them to visit the class.

*Modifications:*

- Create a student handout with the vocabulary words and questions already provided.
- Provide students with the definitions and have them match them to the appropriate vocabulary words.
- Provide fill-in-the-blank responses for the Comprehension Questions, allowing students to listen for appropriate words to complete the sentences.
- Download the video transcripts (if available) and provide to students.

**Reflection:**

Use the space below to reflect on the success of the lesson. What worked? What didn't? These notes can be used to help the next time you teach the lesson. In addition, the Department would appreciate any feedback. Please visit **http://www.azgfd.gov/focuswild** and submit a lesson evaluation.